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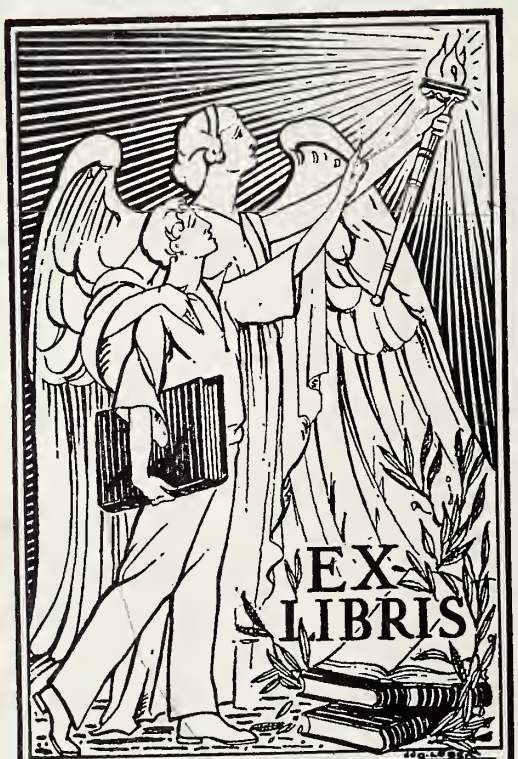
by Arnold Gesell, M.D.



THE FIELD OF VISION

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DEVELOPMENT OF THE INFANT WITH RETROLENTAL FIBROPLASTIC BLINDNESS

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Retrolental fibroplasia is doubly charged with developmental factors. It is itself a specific form of maldevelopment and it is almost invariably associated with prematurity of birth. The infant therefore suffers from two closely related handicaps. But fortunately the handicaps are not uniformly severe, and a significant proportion of children achieve a considerable measure of normal development in spite of impairment of vision and preterm birth.

It should be emphasized at once that uncomplicated prematurity in itself does not seriously dislocate the usual course of behavioral development in an otherwise healthy infant. The expected patterns of behavior appear in relatively normal sequence, and at appropriate age levels, if allowance is made for the amount of prematurity and if the infant is appraised in terms of a corrected chronological age.

For example, we can cite a seeing infant born 8 weeks prematurely, who at 24 weeks of age assumes a symmetric posture as he lies in the crib; he holds his head in the midplane, but rotates it to follow a dangling toy through an arc of 180 degrees; he brings his hands together over his chest, but he does not grasp the toy. These behavior patterns indicate that he is functioning at a 16 weeks maturity level. But this is not a genuine retardation, for in reckoning a corrected chronological age, the infant is entitled to a discount of 8 weeks. Subtract 8 from 24 weeks and the infant's behavior proves to be neither backward nor accelerated. The developmental outlook on the basis of uncomplicated prematurity can be entirely favorable.

In retrolental fibroplasia the prematurity may be variously complicated; the developmental potential may be restricted, reduced and deflected in many different ways, apart from the ocular conditions. In appraising the developmental status of the RLF infant, the examiner must take into account any associated neurologic injuries or defects, making due allowance for the degree of prematurity, which may be as much as 14 weeks. Such allowance will improve the developmental prognosis, particularly if normal behavior patterns are in some degree observed in manual and body postures, in spontaneous play activities and exploitations in language and in interpersonal responses.

Elsewhere we have shown how a developmental examination of the behavior of a blind infant can serve to reveal normal growth potentials, even in the presence of bilateral retrolental fibroplasia, and extreme prematurity. A brief excerpt is cited from the case record of an infant girl, birth weight 999 grams; estimated prematurity, 13 weeks; physical status at 35 weeks, height norm of 20 weeks and weight norm of 24 weeks; corrected chronological age 35 weeks minus 13 weeks or 22 weeks; estimated behavior maturity status 20 plus weeks.

The infant showed slight sensitivity to strong light, indicating a small residuum of vision. In the supine position, she extended her arms laterally, pumped with both feet, rolled to the side, squealed with pleasurable vocalization. She brought hands to mid-line when examiner

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pressed a rattle against chest. Seated in the supportive examining chair she actively exploited the table-top with scratching and an incipient groping and corralling approach to cube, grasped cube on contact. She noticed her mother's voice and quieted when talked to. *Prognosis:* favorable because of drive, integrativeness, and satisfactory personal-social adjustments.

Re-examination at 16 months of age, corrected chronological age—56 weeks, confirmed the favorable prognosis. Sensitiveness to light apparently was lost. Irides previously slaty blue, now a dirty brown. Behavior near 56 weeks level. She stood momentarily alone; withdrew a cube from a cup; released a ball in to and fro play; cast objects; comprehended several words; vocalized with incipient jargon. Showed spirited drive, emotional reactiveness combined with control, and a perceptive parent-child rapport. Outlook excellent if adequate socializing experience can be provided throughout the next five years.

This case is briefly cited to indicate that even a combination of extreme prematurity, blindness and neonatal cyanosis does not necessarily produce permanently serious retardation. If the child inherits normal or superior growth potentials, blindness of itself does not bring about a marked reduction of mental development. Likewise, prematurity of birth by itself does not annul such potentials. Unfortunately, the deep and obscure factors which cause prematurity, may also inflict deficits and deviations which impair and retard the normal growth of the infant's action system. The anxiety of the parents naturally concentrates on the blindness; but with time and tactful guidance they may be helped to recognize the more basic reality—the curtailment of the child's total development.

The problem of retrolental fibroplasia cannot be neatly circumscribed. Whether we call RLF a developmental disease, or a dysplasia, it is always manifested in a complex of conditions, which involve the total organism of the infant. Appraisal and treatment must take into account the total behavior picture in terms of developmental deficits, liabilities and assets. Every child presents a distinctive symptom complex depending upon the nature of the prematurity and the degree of ocular and cerebral involvement. If the prematurity is relatively uncomplicated, and if there is a residuum of vision without neurologic impairments, the general developmental outlook is relatively favorable. It is especially favorable if the child has a good heredity and manifests drive in spite of or because of his handicap. A vitally endowed child makes remarkable use of even a modicum of vision.

For these reasons, the behavior characteristics of the blind infant need critical attention during the first year of life and the years which immediately follow. The behavior patterns should be interpreted in terms of their developmental import, so that the total child as well as the visual defect may be kept in mind. Postural behavior is of basic significance from early infancy, even though the child does not seem to be using his posture to adaptive purposes. Postural behavior and activity cannot be taught; but it can be stimulated and directed as it emerges. Head control, head rotation, head lifting, sitting with support, independent sitting, rolling, crawling, creeping, standing should be encouraged, not prematurely, but in season. One might almost say that the blind infant must live and learn through postural controls and postural adjustments.

A developmental approach to the medical and education problems of infant blindness is realistic. It recognizes limitations as well as positive potentials. However it emphasizes the positive factors in diagnosis, supervision and training and it uses the concept of growth to help the parents to understanding and acceptance. The parent who learns to think in terms of development is most likely to regard the whole problem in truer perspective. This leads to better emotional adjustment. The medical social worker has many opportunities to interpret the infant's handicap and progress from the standpoint of development.

SOME GUIDANCE SUGGESTIONS FOR THE PERIOD OF INFANCY

The guidance suggestions which are formulated below are based on a developmental approach and apply mainly to infants who show a fair measure of normal potentials and which call for periodic appraisal and supervision. For concreteness the suggestions are phrased in the form of brief instructions.

Treat the blind infant, so far as possible, as though he were an ordinary child; but with special helps to make up for his handicap.

The first three years are of supreme importance. We must give him a chance to get a maximum amount of experience, through the senses of touch and of hearing and always through postural adjustments.

Therefore, let him sit up, with pillow or other support, for short periods from time to time during the day. Provide a small bed table and use a high chair with a roomy tray, so that he will have plenty of opportunity to use his hands.

As he grows older do not let him lie on his back too much during waking hours. Place him on his stomach, on the floor, so he can pivot and roll. Encourage him to creep when the time comes.

(*Continued on last page*)

causes, in order of their importance are infectious diseases, injury, tumors, general diseases, and an occasional case of poisoning. A comparison of the figures presented shows a downward trend in blindness due to causes as infectious diseases and injury. Undoubtedly still further progress into reduction of blindness among children can be made by the prevention of infections and accidents, and the investigation of patterns of heredity. An outstanding need is for the successful outcome of research to determine factors responsible for retrolental fibroplasia. This disease accounts for one-third of blindness in children.

NEWS IN THE FIELD

At the Eastern Regional Conference of the International Council for Exceptional Children, held in New York City in November, participants in the workshop on Sight-Saving considered the need for a public relations program to acquaint doctors and parents, as well as teachers, with the work of sight conservation classes; the transfer of eye information from grade school to high school; the progress of those graduating from Braille and sight-saving classes; a report on the intellectual and achievement levels of the partially sighted; the teachers handbook explaining the function of the special class and its integration with the regular classroom; and the planned publication by the New York City Board of Education of a curriculum bulletin for visually handicapped children designed to assist the regular classroom teacher in her knowledge of the methods and programs in a sight conservation class.

The revised edition of *Introduction to Exceptional Children* by Harry J. Baker, Ph.D., The Macmillan Company, New York, is welcomed as a practical reference in understanding the various types of exceptional children. The text presents the characteristics, problems, and latest concepts of care and education of the handicapped and the exceptional child.

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(*Continued from second page*)

How encourage him? By voice, by playfulness, and by slowly withdrawing a toy out of reach, so that he will pursue it. Use this method even now when he plays at his work table with play objects.

Give him a variety of objects. Let him put safe objects to his mouth. He learns about them through mouthing. He does not need fancy toys. Simple objects like these are better: wooden blocks, wooden clothespins, string, stout crumply paper, squeak toys, plastic rings, strings of plastic or wooden beads, tin pan, big ball, small ball, a length of stout clean window cord, a dangling toy that will oblige the child to reach upward, rubber blocks with bells inside, enamel cup and spoon, wrist bells, and wooden plates.

You will not, of course, give him everything at once; and you will put a premium on the things he likes best. But you can hardly give him too much early experience through the manipulation of objects, objects, objects. Let him manipulate in all positions, lying down, on his stomach, and especially when sitting up.

Do not keep him too clothed. Short sleeves and bare legs during some of his play periods will work to his advantage. The sense of touch is not confined to the fingers but embraces the whole skin. He will learn through arms and legs. In due time you may bathe him in an extra size tub and prolong the bath to give him the advantage of free water play. Let him splash; later let him reach out to feel the flow of water from the faucet.

All of these experiences should come about in natural situations. You do not need to try to "teach" him. You simply furnish the opportunities which will enable him to acquire his own experiences through touch and sound.

During babyhood, these experiences must be very abundant, so that he will not become too wrapt up in his subjective self. He must make thrusts into the physical environment through body posture, through reaching out, through ceaseless manipulation as banging, pulling, tearing, waving, or mouthing. These touch experiences are the most fundamental of all. They take him into the *World of Things.*

They also take him into the *World of Persons.* He learns to associate certain touch cues with the sound of individual voices, with spoken words, with playful song, and with the welcome presence of familiar members of the household. Simple social situations should be set up time and time again so that he will not be confused by a superabundance of medley talk.

But above all *Don't let the Baby retreat into himself during these fast growing months.* Draw him out into the world. Keep him in touch.

LIGHT ON SIGHT PROBLEMS

In view of the many inquiries received concerning athletes with defective vision, the following question and the reply of a consultant is reprinted as published in the October 31, 1953 issue of The Journal of the American Medical Association.—ED.

I would like an opinion on the eligibility of high school boys for contact sports who have severe eye defects. Such defects include (1) a condition in which all vision has been lost in one eye but is normal or nearly so in the other eye and (2) a case in which vision is 20/100 in both eyes without glasses, and, as in football, protectors are not practical, and the boy apparently plays satisfactorily without glasses.

Answer.—*Reasonable caution would seem to suggest that a boy who has lost the vision of one eye should not play football. The resulting loss of peripheral vision and depth perception would be a considerable handicap and increase the probability of injury. The possibility of injury to and even loss of the other eye must also be given consideration. While a plastic face protector attaching to the headgear is now available, it provides no guarantee against eye injury. It affords some protection against blows, but small objects can penetrate the opening left to allow for clear vision. The final decision on the matter should be made by the parents in consultation with the physician only after carefully weighing of these factors against the boy's wish to participate. The modern outlook toward the handicapped is to encourage as near normal activity as possible, but there are other less hazardous sports to which such a youth could turn.*

For boys with decreased vision in both eyes the problem differs. Even though a partially sighted player can compensate to some extent for his visual deficiency, he cannot be as safe or effective a performer in sports as he might be with normal vision. In sports like track, participants can wear their glasses. Some performers find it helpful to tape the bows at the temple to prevent displacement during play. In basketball satisfactory guards are available, but they are somewhat cumbersome and participants generally dislike wearing them. Since there is no guard that can make wearing glasses in football safe, the most satisfactory solution is contact lenses where these are practical and can be tolerated. The use of contact lenses by college and professional players is becoming commoner. For high school players, however, the cost is often prohibitive.

TRENDS

Since both eyes are used in everyday vision, the ability to wear glasses comfortably depends on the proper relationship of one eye to the other. Consequently, writes Dr. Abraham Schlossman in the November, 1953 issue of *The Eye, Ear, Nose and Throat Monthly* no refraction is complete without testing binocular acceptance. When one eye is covered the general brightness of the field decreases. Consequently, the contrast value of the test letters is reduced and they are seen less distinctly with one eye than with both eyes. Also, some have poor vision with each eye tested individually, but much better acuity when using both eyes together. Often the dominance of one eye over the other is not apparent when each eye is tested separately. Some patients are quite uncomfortable when vision in both eyes is equalized by use of spectacles. In these cases cerebral relationships are such that dominance must be maintained for the comfortable wearing of glasses. Binocular manifest refraction affords the best method for evaluating dominance. Dr. Schlossman concludes that the fundamental objective in the correction of refractive errors is to obtain the best possible vision combined with the greatest amount of binocular comfort. Therefore, the best method for accomplishing this purpose is to make binocular refraction the final step before prescribing glasses.

Further discussion in regard to the Ridley implant in cataract surgery is presented by Georgiana D. Theobold, M.D., in the *American Journal of Ophthalmology*, October, 1953. Writing editorially, the doctor cautions that the operation in which a cataractous lens is replaced by an acrylic lens, is not as simple as it sounds. Case reports indicate that only a few eyes have been able to tolerate the foreign body. The doctor concludes that the inflammatory processes and the connective tissue which forms a dense band around the implant is the answer to the "insult" of the irritating acrylic lens.

A recent release of the National Society for the Prevention of Blindness concerns the trends of blindness in children during the years 1926 to 1950. Data is based on ophthalmic records of 2,796 blind children under 21 years of age in seven states, analyzed by year of onset of blindness. Although the cases of prenatal origin accounted for considerably more than half of the blindness in children, little is known of the causes. The one exception is the factor of heredity. The hereditary rate showed a slight upward trend between 1930 and 1940, but appears to have dropped during the last ten years. Other